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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
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Developments Resulting from Utilization Research
That are Now in Commercial Use

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May, 1957

CEREAL AND FORAGE CROPS

1. A new textile fiber from corn protein (zein).
2. Production of riboflavin by Ashbya gossypii.
3. Production of vitamin B₁₂ by Streptomyces olivaceus.
4. Fungal amylase process for industrial alcohol.
5. Commercial production of penicillin.
6. Commercial production of clinical dextran - a blood plasma extender.
7. Fermentative production of sodium gluconate.
8. Starch sponge as a hemostatic agent.
9. Saccharic acid and its salts for sequestering agents.
10. Waxy cereal grains as sources of new industrial starches.
11. Batter process for production of starch and gluten from wheat flour.
12. Freezing procedures for bread and other baked products.
13. Waxy rice flour as a thickener for sauces and gravies in prepared frozen foods and canned foods.
14. Improved drying techniques for rough rice.
15. Process for canning white rice.
16. Humidity control during rice milling to improve yields of head rice.
17. Aeration of stored rough rice to maintain high quality.
18. Preservation of vitamins and other nutrients in alfalfa meal with an antioxidant.
19. Addition of vegetable oils or animal fats to dehydrated alfalfa meal to control dusting.
20. Improvement of steeping process in corn wet-milling.
21. Safe drying of corn for industrial utilization.
22. Production of 2-ketogluconic acid by fermentation.
23. Industrial yeasts improved by hybridization.
24. Important microorganisms made available to industry.
25. Gibberellin - a plant growth regulator.

26. Commercial production of itaconic acid.
27. Corrugating and structural boards from wheat straw.
28. Ground corn cobs for soft-grit blast cleaning and other uses.
29. Mechano-chemical process, a new and revolutionary method for producing pulp from straw in high yield and with excellent strength characteristics.

COTTON AND WOOL

1. Cotton conforming bandage.
2. Heat- and rot-resistant cotton by partial acetylation.
3. Use of CMC (Carboxymethylcellulose) in laundered goods to improve resistance to soiling.
4. Tobacco shade cloth with longer life.
5. Permanent flame-resistant cotton cloth with THPC (Tetrakis-hydroxymethyl-phosphonium chloride).
6. Loom attachment for weaving dense cotton fabrics - air-permeable but water-impermeable.
7. New machine for more efficient opening and blending of cotton from the bales.
8. Differential dye test to evaluate maturity and dyeing characteristics of raw cottons.
9. Improved nep control through new techniques for carding cotton.
10. New guides for drafting cotton to improve the uniformity and strength of the resultant yarns.
11. Formulas for determining the correct distribution of zone drafts on three types of long draft roving systems.
12. New instrument for measuring fiber properties which aids the development of improved quality cottons with high elongation.
13. Printed cotton fabrics for fertilizer bags suitable for re-use in garments.
14. Stabilization of nitrocellulose in the manufacture of gum cotton from cotton linters.
15. Speedy method for conditioning wool prior to spinning and weaving.
16. Development of objective standards for grading the yellowness of wool.

FRUITS AND VEGETABLES

1. Process for recovering volatile flavor concentrate (essence) from apples and other fruits for use as a flavor. Engineering design for a fruit essence recovery unit.
2. Full flavor superconcentrated fruit juices from apples, grapes, strawberries, cherries and other fruits.
3. Process for recovery of fruit essences from preserve manufacturing operations.
4. Citrus fruit juice powders - orange, grapefruit and lemon.
5. Preparation of highly concentrated (6- to 7-fold) frozen citrus juice.
6. Development of color standards for orange juice.
7. Process for production of frozen purees of citrus and other fruits.
8. Flash pasteurization of citrus juice.
9. Frozen concentrated citrus juices.
10. Maturity test for oranges and grapefruit.
11. Method of developing color in citrus fruits by ethylene.
12. Deaeration equipment for use in canning single-strength juices.
13. Dehydrofreezing of apples.
14. Frozen concentrated strawberry and other berry juices.
15. Treatment of berry picking boxes with sodium orthophenyl phenate to control mold.
16. Method for removing thrips, etc., from cane berries.
17. Ripening procedure for freestone peaches for canning.
18. Ripening methods for juice apples.
19. Process for canning dates.
20. Pectin enzyme control in tomato product manufacture.
21. Tomato juice powder.
22. Dehydrofreezing of pimientos.

23. Objective indexes of quality deterioration in frozen fruits and vegetables during distribution.
24. Low temperature lye peeling for prepeeled potatoes.
25. Improvements in dehydrated diced potatoes and potato granules.
26. Starch-coated dehydrated diced carrots.
27. Control of "delay" off-flavor in frozen peas.
28. Improved procedure for blanching green beans for freezing.
29. In-package desiccation (for citrus and tomato powders, potato chips, hard candies, and dehydrated vegetables).
30. Froth flotation cleaning of vegetables for processing.
31. Single-pass evaporator with steam-injection heating for use in concentration and pasteurization of juices.
32. Fluidized bed drier for use in the production of potato granules.
33. Air-lift drier for use in the production of potato granules.
34. Belt-trough drier for use in dehydrofreezing or dehydration.
35. Design for a laboratory fermenter (the "Humfeld Fermenter").
36. Procedure for measuring frozen food temperature in unbroken cases without sacrifice of product.
37. Use of nuclear magnetic resonance for automatically controlling moisture content of processed agricultural products.
38. Pasteurization process for fresh-pack pickle products.
39. Reduction of losses in cucumber pickling by removing the replacing brine, thus reducing enzyme action which causes soft stock.
40. Process for preparation of chlorophyll, xanthophyll and carotene from leaf meals.

OILSEEDS

1. Polyamide resins from soybean oil for use in gelled paints, adhesives and printing inks.
2. Soybean protein adhesives for shotgun shell casings and water-resistant boxboard.

3. Soybean oil of improved flavor stability.
4. Improved procedures in production of isolated soybean protein.
5. A process for removing the beany and bitter flavor of soybean products and for improving their color.
6. Nitrogen solubility index - an analytical procedure used to control the processing of soybean oil meal.
7. Taste panel procedures for evaluation of soybean oil and other edible fats.
8. Dimer acid, a new industrial raw material from vegetable oils.
9. High shear agitation to improve the refining of crude cottonseed oils.
10. Improved preparation of cottonseed for direct solvent extraction.
11. New filtration-extraction process for oilseeds.
12. Non-clogging vapor-tight screw-conveyer for continuously feeding oil seed flakes to solvent extraction systems.
13. Improved recovery of solvent and improved color of oil from cottonseed solvent extraction plants.
14. High quality cottonseed meal for feeding to poultry and swine.
15. Chemically modified cottonseed oil (acetoglycerides) for use in cosmetics.
16. Methods for determining gossypol in cottonseed meats, meal and oil.
17. Improved method for determining moisture in peanut kernels.
18. Improved tung-oil vehicle formulations for use in paints.
19. Improved methods for handling and processing tung nuts.

SUGAR AND SPECIAL PLANTS

1. Improved techniques for processing sugarcane.
2. Reduction of losses in sugar content and purity by prompt grinding of sugarcane.
3. Recovery of aconitic acid from sugarcane molasses.
4. Improved yield of beet sugar through reduction of fermentation in extractors.

5. Basic studies leading to method for removing floc-forming materials during processing of sugar beets.
6. High-flavor maple sirup.
7. Dial thermometer for use in maple sirup manufacture.
8. Sanitary handling of maple sap.
9. Color standards for official grading of maple sirup and extracted honey.
10. Honey-fruit spread.
11. Production and pharmaceutical use of rutin and quercitrin.
12. Development of steam turpentine still.
13. Development and introduction of Olustee Process of pine gum cleaning.
14. Covered separator and dehydrator for removing water from turpentine.
15. Improved removal of rosin acids from gum turpentine.
16. Steam cleaning of dip barrels.
17. Continuous still for the production of turpentine and rosin.
18. Process for production of myrcene.
19. A new chemical, maleopimaric acid, produced directly from pine gum and made available for use in plastics, photographic chemicals and printing inks.
20. The use of paramenthane hydroperoxide - produced from turpentine - as a catalyst in the manufacture of synthetic rubber.

POULTRY, DAIRY AND ANIMAL PRODUCTS

1. Processing methods for producing satisfactory dried eggs.
2. Sterilization of shell eggs by high temperature treatment for a very short time.
3. Modifications of scalding and chilling procedures in the freezing and storage of poultry to reduce labor and avoid toughness of product.
4. Feather meal for fertilizer and feed uses.
5. Dairy waste disposal system which prevents stream pollution.
6. Improved heat exchanger for high-temperature pasteurization of milk.

7. Improvements in cheese manufacture.
8. Use of whey in caramels and in other candies and foods.
9. Use of butter in candies increased by using yeast to lengthen shelf life.
10. Use of soaps made from animal fats in manufacture of synthetic rubber.
11. Improved keeping quality of farm rendered lard.
12. Animal fats in industrial tinsplating.
13. Process for making high-quality technical oleic acid.
14. Vinyl stearate from fats for use in new-type plastics.
15. Epoxidized fats and oils for use in plastics.
16. Use of technical grade fats in animal and poultry feeds.
17. Synthetic detergents from fats.

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